REMARKS

Claims 1-32 are pending in the present Application. With this Response, Applicant amended Claims 1, 2, 4, 5, 9, 11, 18, 20, 21, 22, 27, and 29. Applicant also added new claims 30-32. The amendments and new claims are all supported by the specification and do not add new matter. All pending claims are shown in the detailed listing above.

Claim Rejections – 35 USC § 102

Claims 1-5, 9-11, 17-23, 27-29 are rejected under 35 U.S.C. §102(a) as being fully anticipated by Meng et al. (U.S. Patent 6,512,411).

Currently amended claim 1 recites:

"1. A power control circuit comprising:

a switch array comprising:
switches;
a flying capacitor; and
an output voltage terminal, capable of providing an output voltage;
a feedback loop, coupled to the output voltage terminal; and
a voltage regulator block:

comprising an Analog-to-Digital converter, configured to output a digital signal of more than one bit, the digital signal representing a difference of the output voltage and a reference voltage;

configured to regulate the output voltage; and

coupled to the feedback loop and to the switch array, the voltage regulator block configured to regulate the output voltage, wherein

at least one of the switches is a segmented switch, comprising more than one switch-segment."

The Office Actions states:

"Meng et al. show, (in e.g., the(ir) figure(s) 3 and corresponding disclosure) As to claim 1,

> A power circuit comprising: a switch array comprising: switches (40), a flying capacitor (24-26); and an output voltage terminal (22), capable of providing an output voltage (OUT at 22); a feedback loop (into, e.g., 16) coupled to the output voltage terminal; and a voltage regulator block (including 32/34/36/38), coupled to the feedback loop and to the switch array, the voltage regulator block configured to regulate the output voltage, wherein at least one of the switches is a segmented switch (as stated at column 5 lines 15-21, the arrays are segmented switches-e.g., 30a and 30b,) comprising more than one switch-segment (also as stated at column 5 lines 15-21 the segmented switches contain more that one switch-segment 30a-30i)."

In response, Applicant respectfully traverses the rejection on the basis that Meng does not have a

> "a voltage regulator block:
>
> comprising an Analog-to-Digital converter, configured to output a digital signal of more than one bit, the digital signal representing a difference of the output voltage and a reference voltage"

Indeed, the Office Action identifies Meng's mode operation control logic 36 as an "Analog-to-Digital converter." However, mode operation control logic 36 receives only digital signals as input and therefore it is not an Analog-to-Digital converter. No other block can be identified as an "Analog-to-Digital converter, configured to output a digital signal of more than one bit" either. E.g. comparator 34 receives analog inputs and outputs a digital signal. However, that signal is a single bit digital signal, only indicating which of the two input signal is greater.

Applicant also respectfully traverses the rejection on the basis that Meng does not have a "segmented switch." Indeed, Meng's switches 30a and 30b are not segments of a single switch. Instead, they are separate switches with separate functions. Switch 30a and 30b work in alternation during the charge-cycle and the discharge-cycle of the charge pumping operation of the circuit. Switches 30a and 30b are turned on alternatively in these two cycles, as explained in col. 7, ll. 6-17. This fact is well captured by noting that switches 30a and 30b cannot be turned on simultaneously during regular operations.

In contrast, the switch segments of the present invention are segments of a single switch. They are not used in alternation during the charge-cycle and the discharge-cycle. They are turned on in response to regulating signals during the entire operation. For example, all of the switch segments of the present invention can be turned on simultaneously during regular operations. In contrast, Meng's switches are turned on in alternation during regular operations. While these considerations are clearly captured in the present form of claim 1, Applicant also added new claim 30, which captures the above considerations in further detail.

Applicant also respectfully traverses the rejection on the basis that Meng does not regulate the output voltage by a "digital signal representing a difference of the output voltage and a reference voltage." Instead, Meng transitions the mode of operation based on a comparison of the input voltage and the output voltage, generated by comparator 32. While this consideration is clearly captured in the present form of claim 1, Applicant also added new claims 31-32, which capture the above considerations in further detail.

At least for the reasons stated above, claim 1 is allowable over Meng and therefore allowance of claim 1 is respectfully requested.

The Office Action rejected claims 2-5. The Office Action states:

"As to claim 2;

> The control circuit of Claim 1, wherein the switch-segments of a segmented switch (e.g., 30a and 30b) in figure 4a, e.g.,) comprise first and second terminals, wherein the first terminals of the switch-segments are coupled to a first shared rail (both 30a and 30b are connected to, via 30c and 30d, the rail shared by C_1 and C_2); and the second terminals of the switch-segments are coupled to a second shared rail (V_{IN}).

As to claim 3;

> The control circuit of Claim 2, wherein the switch-segments have open and closed switching states, wherein the conductance between the first and the second shared rail increases when the number of closed switch-segments between the first shared rail and the second shared rail increases (this occurs when, e.g., both 30a and 30b are open, he conductance between them and the rails as described in claim 2 increases).

As to claim 4;

> The control circuit of Claim 1, wherein the switch-segments of a segmented switch are organized into switch-segment groups, wherein the switch-segment groups can be labeled so that the number of switch-segments in the switch-segment groups are related to each other as increasing powers of two (labeling can be done, and increasing as powers of two can also be done).

As to claim 5;

> The control circuit of Claim 1, wherein the switch-segments comprise transistors, wherein the transistors are selected from the group of bipolar junction transistors and MOS-FETS (these arrays are made of transistors which are either bipolar or mos type)."

In response, Applicants respectfully traverses the rejection because claims 2-5 depend from allowable claim 1 and are therefore, at least for this reason, allowable.

Furthermore, claims 2-5 were amended to depend from claim 30, which recites the segmented switches in more detail. For this added reason, claim 30 and therefore claims 2-5 are allowable over Meng.

The Office Action rejected claims 9 and 10. The Office Action states:

"As to claim 9;

> The control circuit of Claim 1, wherein the voltage regulator block is a digital voltage regulator block (see, e.g., figure 2 and element 28).

As to claim 10;

> The control circuit of Claim 9, wherein the digital voltage regulator block is configured to regulate at least one of the switch-segments of at least one segmented switch (see, e.g., column)."

In response, Applicants respectfully traverses the rejection because claims 9 and 10 depend from allowable claim 1 and are therefore, at least for this reason, allowable.

Furthermore, Applicant also respectfully traverses the rejection on the basis that Meng does not have an

> "Analog-to-Digital Converter ... configured to control the switches by one of a direct signal and a digitally processed signal."

As described above, mode operation control logic 36 is not an Analog-to-Digital converter.

The Office Action rejected claim 11. Currently amended claim 11 recites:

> "The control circuit of Claim 9, the digital voltage regulator block comprising:
>
> an encoder, coupled to the output of the Analog-to-Digital converter, configured to generate a digital error signal from the difference of a reference voltage and a feedback voltage, provided by the feedback loop."

The Office Action states:

"As to claim 11;

> The control circuit of Claim 9, the digital voltage regulator block comprising: an Analog-to-Digital converter (36); and an encoder (34), coupled to the Analog-to-Digital converter (36), configured to generate a digital error signal from the difference of a reference voltage (42) and a feedback voltage (OUT), provided by the feedback loop."

In response, Applicants respectfully traverses the rejection because claim 11 depends from allowable claim 1 and is therefore, at least for this reason, allowable.

Furthermore, Applicant also respectfully traverses the rejection on the basis that Meng does not have:

> "an encoder, coupled to the output of the Analog-to-Digital converter, configured to generate a digital error signal from the difference of a reference voltage and a feedback voltage, provided by the feedback loop."

Indeed, The Office Action identifies comparator 34 as the encoder. Visibly, Meng's comparator 34 provides an input signal for the putative Analog-to-Digital converter 36, whereas claim 11 recites that the encoder is coupled to the output of the Analog-to-Digital converter.

The Office Action rejected claims 17-23 and 27-29. These rejections are based on the comments made in relation to earlier claims. In response, Applicant refers to the above presented arguments, which are incorporated herein by reference.

Allowable Subject Matter

The Office Action objected to claims 6-8, 12-16, and 24-26 as being dependent upon a rejected base claim.

In response, Applicant gratefully acknowledges that these claims can be rewritten in independent to be made allowable. Further, Applicant respectfully points out that claims 6-8 and 12-16 depend from allowable claim 1 and therefore are allowable themselves, further, claims 24-26 depend from allowable claim 22 and therefore are allowable themselves.

CONCLUSION

Applicant respectfully suggests that all pending claims have been shown to be allowable and therefore requests that all pending claims be allowed and the case passed to issue. Should the Examiner wish to discuss the Application, it is respectfully requested that the Examiner contact the undersigned at (415) 772-7434.

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I hereby certify that this correspondence is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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